

SPECIMEN CONTRACT

ARTICLE 1. STATEMENT OF WORK

1. General

The Contractor shall furnish the services of _____, as Principal Investigator (PI) and the necessary administrative, technical and scientific support personnel to design, develop and deliver the ABC instrument and conduct the associated science investigation, for the MSL Mission. In the performance of this effort the Contractor shall:

1.1 Design

Perform all design and analysis necessary to fabricate and operate the ABC instrument.

1.1.1. Preliminary Design

Generate and document a preliminary design for the ABC instrument in accordance with the requirements of the Instrument Functional Requirements Document (IFRD) and Interface Control Document (ICD). This effort is to include, but not be limited to the following:

1. Design, analysis, and tradeoffs necessary to substantiate a recommended design.
2. Generation of complete models or breadboards as necessary to demonstrate the performance of the design.
3. Presentation of the results to JPL for approval at an Instrument Preliminary Design Review (IPDR).

1.1.2 Detailed Design

Upon JPL approval of the preliminary design at IPDR, generate and document a detailed design of the ABC instrument. The effort is to include, but not be limited to the following:

1. Refine computer module breadboards and tests to determine performance as required by the IFRD.
2. Detail electrical, mechanical and thermal design, worst-case analysis, reliability lifetime testing, and tradeoffs necessary to facilitate the recommended design.
3. Present the results of the detailed design effort to JPL for approval at the Instrument Critical Design Review (ICDR) prior to proceeding with flight hardware parts or material procurement or fabrication and test.

1.2 Fabricate and Procure

Fabricate and/or procure the following items in accordance with the designs generated above: [Explain any differences to be utilized between the EM and flight units.]

- 1.2.1 One (1) Engineering Model (EM) that represents the form fit and function of the flight instrument. After delivery of the flight instrument, an EM that incorporates any configuration, or operational changes made to the flight unit since the initial EM delivery will be provided.
- 1.2.2 One (1) Flight Instrument (including thermal blankets if required by the ICDs).
- 1.2.3 Provide a Manufacturing Flow and Product Inspection Plan.
- 1.2.4 Fabricate/procure sufficient spares to maintain the EM and flight instrument hardware.
- 1.2.5 Provide instrument unique payload Ground Support Equipment (GSE) for the EM and Flight Instrument.
- 1.2.6 Provide the software and documentation necessary to operate the EM and flight instrument.
- 1.2.7 Provide a Science Operations and Planning Computer (SOPC), to be located at home institution.

1.3 Assemble

Assemble the deliverable end items called out above from fabricated and procured elements.

1.4 Test and Integrate

Develop an Instrument Verification and Test Plan and perform the following tests on the flight unit instrument:

- 1.4.1 Integration Test Requirements: [Define testing to be performed during integration of subsystems into the flight instrument.]
- 1.4.2 System Test Requirements: [Define tests to be performed on the integrated instrument to qualify (demonstrate readiness of) instrument for installation on the MSL spacecraft. Specify what must be done by test to qualify the system:]
 - 1. Test purpose/objectives.
 - 2. Constraints on whether test requirement objectives can be met only by testing, or by modeling/analysis, or by inspection.
 - 3. Combination of system functions to be tested.
 - 4. System modes to be tested.
- 1.4.3 Calibrate and characterize the flight unit instrument before delivery to JPL.
 - 1. Develop and deliver detailed calibration plans.
 - 2. Prepare and deliver a calibration report that documents the calibration of the flight instrument.

- 1.4.4. Notify JPL not less than three (3) working days in advance of any significant inspections or tests. JPL shall have the right to witness any tests or inspections conducted.
- 1.4.5 Support electrical and functional testing of the flight instrument during integration with the MSL spacecraft.
- 1.4.6 Prepare instrument test requirements and procedures and support system-level testing to verify the design, performance, and robustness of the instrument for Mars operations.

1.5 Logistic Support:

- 1.5.1 *Parts, Materials and Processes:* Procure all parts and materials necessary for the fabrication, assembly, and test of the instrument and its ancillary equipment in accordance with the Mission Assurance Plan.
- 1.5.2 *Tooling:* [Specify any special tooling which the Contractor will be required to make and/or provide.]
- 1.5.3 *Test Equipment:* Provide test equipment. This test equipment shall include a CAD model of top assembly, an analytical thermal model, and a payload interface simulator to the project. The system shall be capable of emulating all external instrument electrical interfaces, performing stand-alone testing of the instrument and displaying quick look data. Account for cabling necessary to interface with the instrument, and the acquisition of workstations or additional test equipment needed to test the instrument.
- 1.5.4 *Packaging:* [Specify any special packaging requirements. If shipping containers are to be provided, state the number, spares, how many units can be included in each, and specification for the container.]
- 1.5.5 *Transportation:* [Stipulate the method of transportation for delivery to JPL and/or to other sites, if required. If the instrument is to be hand carried, explain the details here.]
- 1.5.6 *Technical Manuals and Publications:* Develop and provide the technical manuals or publications as required by **Exhibit II** entitled “Data Requirements Documents.” [The method for review and approval by JPL, and distribution of Contractor submitted Data Requirements Documents (DRDs) is specified in **Exhibit I** entitled “Contract Data Requirements List.”.]
 - 1. Prepare the manufacturing sections of the End-Item Data Packages for each instrument board in accordance with Exhibit II.
 - 2. Obtain and submit photographs of the EM and Flight instrument boards.
- 1.5.7 *Training:* [Describe the type of training to be provided. Include location, frequency, facilities required, training materials to be provided, number of people to be trained. etc.]
- 1.5.8 *Contractor Services:* [If maintenance support is required, explain the type of maintenance including the level of effort and skills. Identify the work location(s). If Launch Site support is required, state the kind of support needed, the support skills, and set limits on the level of effort.]

- 1.5.9 *Facilities*: [If the contractor is to provide a facility as a direct cost to the contract, describe the facility configuration here and period of time that the facility will be required. Identify work space to be provided for JPL on-site personnel at the Contractor's facility and for any second tier subcontractors.]
- 1.5.10 *Flight Software*. Provide algorithms, support coding and testing, and participate in reviews for any flight software that is resident in the Spacecraft Command and Data Handling (C&DH) subsystem.

1.6 Program Management

- 1.6.1 *Key Personnel*: [Specify who is to be a key person, i.e. the Program Manager, Design Engineer, etc. This requirement is further defined in the contract as a Special Provision.]
- 1.6.2 *Mission Assurance Program*: Provide a Mission Assurance Plan in accordance with **Exhibit II** (MA-001 through MA-008). Implement the approved plan upon JPL acceptance.
- 1.6.3 *Configuration Management Program*: Provide a Configuration Management Plan in accordance with **Exhibit II** (CM-001 through CM-004). Implement the approved plan upon JPL acceptance.
- 1.6.4 *Safety Program*: Provide a System Safety Plan and Safety and Health Plan in accordance with **Exhibit II** (SA-001 and SA-002). Implement the approved plan upon JPL acceptance.
- 1.6.5 *Technical Support*: [Define the level of effort (number of hours) to be provided for technical support to perform studies and analyses, as may be directed by the Contract Technical Manager. The expenditure of effort is controlled using the Technical Direction Memorandum.]
- 1.6.6 *Reviews and Meetings*: Conduct and/or participate in and provide products for the reviews and meetings in accordance with **Exhibit II** (RE-001 through RE-006). Participate in the following MSL Project reviews and/or meetings:
1. Kick-off Meeting: [This meeting will be considered if the effort requires significant contract administration tasks involving a number of JPL and Contractor disciplines who must communicate with one another on a regular basis.]
 2. Instrument Accommodation Review (IAR). [The IAR will establish the instrument's compatibility with the surface system and facilitate early establishment of a firm commitment with the instrument provider for the Project-supplied resources and interfaces, including mass, power, volume, sample requirements and fields of view, etc.]
 3. Preliminary Design Review: [The Preliminary Design Review (PDR) may include separate reviews including PDRs conducted on Configuration Items (CIs).]
 4. Critical Design Review: [The Critical Design Review (CDR) may also include reviews that start with specific CIs and end with the system CDR.]

5. Instrument Delivery Review (IDR): Prior to instrument delivery to the flight system the contractor shall confirm that the instrument is ready to meet all operational requirements specified in the FRD.
6. Hardware Readiness Certification Review (HRCR). HRCR is a final review of documentation and open item closeout process accompanying delivery of flight hardware for integrations
7. Monthly Management Reviews (MMRs): The contractor shall provide information in support of the MSL Project MMR. The MMR shall address all items required in DRD RE-001, including programmatic, financial, and technical status.

1.6.7 *Plans and Documentation*: Provide Plans and Documentation in accordance with **Exhibit II** (MA-009 through MA-014; MS-001 through MS-008; and SE-001 through SE-002).

1.7 Applicable Documents

1.7.1 The following exhibits are hereby incorporated into and made a material part of the Contract:

1. Exhibit I, "Contract Data Requirements List," dated _____
2. Exhibit II, "Data Requirements Documents," dated _____

1.7.2 The following applicable, project approved, and governing documents are intended to be incorporated into this contract as they become available:

1. ABC instrument to spacecraft Interface Control Document (ICD)
2. MSL Environmental Requirements Document (ERD)
3. MSL Level 3 Payload System Requirements
4. MSL Science & Payload Management Plan
5. MSL Project Policies for Science Data Management
6. MSL Planetary Protection Implementation Plan

2. JPL will: (as applicable)

- 2.1 Approve documents.
- 2.2 Provide designs and drawings (list type and number)
- 2.3 Provide special parts
- 2.4 Provide facilities
- 2.5 Provide special test equipment
- 2.6 Provide ADPE/software
- 2.7 Provide training
- 2.8 Provide technical support in special cases
- 2.9 Maintain, control, and update MSL Project documents

ARTICLE 2. DELIVERY OR PERFORMANCE SCHEDULE

The Contractor shall:

1. [Specify any reports to be provided, i.e. final report of subject inventions, compliance audit reports, etc. as required by the Contract General Provisions.]
2. Except as otherwise provided in this Contract, the point of inspection, acceptance and delivery of all supplies deliverable under this Contract shall be the Jet Propulsion Laboratory, 4800 Oak Grove Drive, Pasadena, California 91109. All such supplies shall be packaged, packed, boxed, or crated in such a manner to ensure safe delivery and shall be shipped prepaid and at the Contractor's expense to the point of delivery.
3. [If appropriate to the need, a statement concerning timeliness, such as "Time is of the essence in this Contract" may be inserted here.]
4. Deliver the following items as indicated in the Statement of Work:

<u>Reference ¶</u>	<u>Item</u>	<u>On or Before</u>	<u>Delivery Point</u>
Exhibit I	All listed CDRLs	Dates defined in Ex.I	JPL (unless otherwise noted in Exhibit I)
1.2.1	Engineering Model		
1.5.3	P/L Interface Simulator		
1.2.2	Flight Instrument		
1.2.3	Mfg. Flow/Insp.Plan		
1.2.1	Refurb. EM		
1.2.5	GSE		
1.2.6	Software & Documentation		
1.2.7	SOPC		
1.5.6	EM and Flight instr.board photos		
1.5.10	C&DH algorithms		
1.4.3	Calibration Plans		